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### Recent progress on thermoacoustic heat engines and refrigerators

Ercang Luo

Technical Institute of Physics and Chemistry, CAS, Beiyitiao Rd., Zhongguancun St., P.O.Box 2711, 100080  
Beijing, China

In this talk, recent progress on thermoacoustic heat engines and refrigerators developed at the Technical Institute of Physics and Chemistry (TIPC), Chinese Academy of Sciences (CAS), is covered, which mainly includes three aspects: (i) Energy-focused thermoacoustic-Stirling heat engines (EF-TASHE) by using tapered resonators are highlighted for both low-frequency ( $\sim 50\text{Hz}$ ) and medium-frequency ( $\sim 300\text{Hz}$ ) operation; (ii) A thermoacoustically driven two-stage pulse tube cryocoolers capable of achieving liquid hydrogen temperature ( $\sim 20\text{K}$ ) is described. In addition, a 300 Hz compact thermoacoustically driven pulse tube cryocooler operating below 80K is also covered. In this part, an acoustical pressure amplifier is highlighted; (iii) A heat-driven thermoacoustic refrigeration system with double thermoacoustic-Stirling configuration for room temperature cooling is reported. This system is able to provide a cooling power of more than 300 W at -20 Celsius Cent degree, showing good prospect as an alternative of CFC refrigeration. Finally, consideration and prospect for future development are forecasted.